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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/589,681	08/16/2006	Toshiyuki Ogata	SHIGA7.054APC	9916

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EXAMINER

THOMPSON RUMMEL, PONDER N

ART UNIT	PAPER NUMBER
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1795

NOTIFICATION DATE	DELIVERY MODE
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06/25/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

jcartee@kmob.com
eOAPilot@kmob.com

Office Action Summary	Application No. 10/589,681	Applicant(s) OGATA ET AL.	
	Examiner PONDER N. THOMPSON RUMMEL	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 16 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>8/16/2006, 3/20/2007</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 6 recites the limitation "the hydrophilic group" in line 1. There is insufficient antecedent basis for this limitation in the claim. There is no mention of a hydrophilic group within claim 1.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

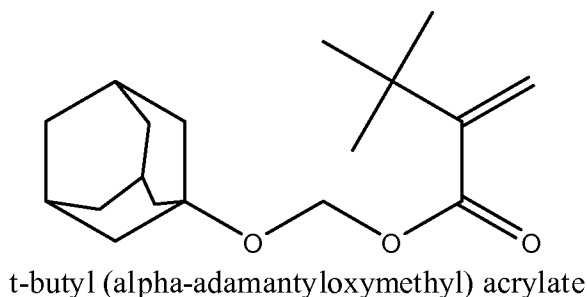
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 2, 4, 7-10 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshida et al (US 2002/0099147).

With respect to the claims above, Yoshida et al discloses a copolymer that can be used in photolithographic materials (paragraph [0044]) such as a photoresist composition by being exposed to light and developer (paragraph [0002]) comprising:

- An alkali soluble group containing a phenolic hydroxyl group, such as a p-hydroxystyrene (Table 1, Example 3, polymer structural unit (B) and paragraph [0058]);
- An acid catalyst (or acid generator - paragraph [0032]);
- A polymer compound, such as t-butyl(α -adamantyloxymethyl) acrylate



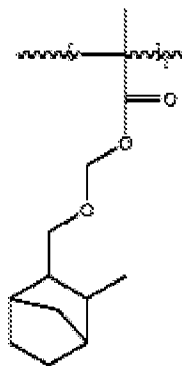
acrylate - TAMA (Table 1, Example 3 - structure shown below), which meets the limitations of applicant's formulas (2) and (3) wherein R₂ in formula 2 and 3 represents a butyl group (a lower alkyl) containing 4 carbons, n and n' in formulas (2) and (3) represents 0, R₁ in formula 1 represents is a cycloaliphatic group - an adamantane group and X in formula (3) represents two hydrogen atoms.

5. Claims 1, 2, 7, 9 and 15-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Park et al (US2002/0177068).

With respect to claims 1, 2, 7, 9, and 15-17, Park et al discloses a polymer for a chemically amplified resist and composition thereof comprising:

- A photoacid generator (paragraph [0028]);

- A base additive, such as triethylamine (a nitrogen containing organic compound – paragraph [0046]);
- An alkali soluble group containing a carboxyl group, such as acrylic acid (paragraph [0044], Synthesis Example 4); and
- A compound that meets the limitations of applicant's formula (2) - a methyl norbornane methoxymethyl methacrylate



(as shown below – paragraph [0044] and Synthesis Examples 1-5) wherein R₂ is a methyl group, n is 1 and R₁ is a cycloaliphatic group (a norbornane group) having less than 20 carbon atoms.

Park additionally discloses a method of forming a pattern comprising:

- Coating the resist on a wafer (paragraph [0037])
- Irradiating the resist with light (exposure – paragraph [0038]); and
- Developing the resist to form a pattern (paragraph [0039]).

6. Claims 1-4, 7-11, 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Ogata et al (Journal of Photopolymer Science and Technology, 2004).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

With respect to claims, Ogata et al discloses a polymer compound comprising:

- An alkali soluble group that is selected from a carboxyl group - an methacrylic acid group (page 485, Figure 2)
- A compound with a dissociable, dissolution inhibiting group, such as 2-adamantyloxy methyl methacrylate (AdOMMA- column 2, page 483 – Experimental and page 485, Figure 2). This compound meets the limitation of applicant's formulas (2) and (3);
- A lactone containing structural unit (page 484 – Section 2.3 Resist Formulation);
- A photoacid generator such as triphenylsulfonium 10-camphorsulfonate (page 484 – Section 2.3 Resist Formulation);
- A nitrogen containing quencher, such as triethanolamine (page 484 – Section 2.3 Resist Formulation);

Ogata further discloses a polymer compound that has an adamantyloxy methyl methacrylate unit with another copolymer comprising a fluorinated acrylate such as 5-[3, 3, 3,-trifluoro-2-hydroxy-2-(trifluoroethyl)propyl] bicyclo[2.2.1] hept-2-yl acrylate or NBHFAA (see figure 1 for AdOMMA-co-NBHFAA).

Ogata et al also discloses the use of the polymers in chemically amplified resist (page 484, Section 2.3, Resist Formulations). An image was made by placing the resist on a substrate; exposing and then developing the resist to form an image (Section 2.5 - Lithographic Characterization - pages 484-485).

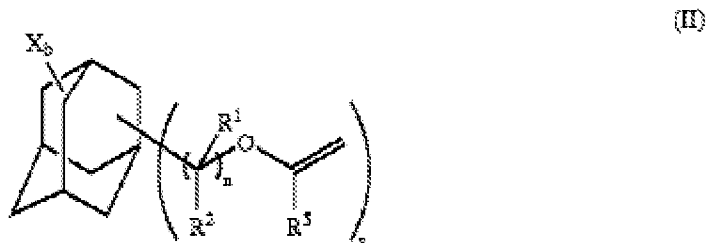
7. Claim 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al (US2002/0177068) in view of Hatakeyama et al (US 2005/0004391).

With respect to claim 5, Park et al discloses the polymer compound of claim 1, however fails to disclose the inclusion of at least one hydrophilic group attached to the cycloaliphatic group of the acid dissociable, dissolution group (ii).

Hatakeyama et al discloses an adamantyl vinyl ether compound that can be used as a monomer for functional resins such as a

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photosensitive resin (paragraph [0001]) represented by the following formula (I):



In formula (10) X_b represents a hydrogen atom, a halogen atom, an alkyl group having 1 to 10 carbon atoms, a hydroxyl group (-OH), a carboxyl group or keto group. The above monomer, when used in a resist, can be used to improve heat resistance, dry etching resistance and acid sensitivity (paragraphs [0004] and [0117]). Further, the polymer compound is excellent transparency even at short wavelengths (paragraph [0118]). Therefore, it would have been obvious to one of ordinary skill within the art to include a hydrophilic group, such as a hydroxyl or carboxyl group as taught by Hatakeyama, within the polymer compound as disclosed by Park to improve sensitivity, transparency and etching resistance.

8. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al in view of Uetani et al (US 6,579,659).

With respect to claim 5, Park et al discloses the polymer compound of claim 1, however fails to disclose the addition of a polar group containing polycyclic group and use of two different lactone containing units.

Uetani et al discloses a chemically amplified positive resist composition that comprises two different lactone units and a polycyclic group containing a polar group, such as 3-hydroxyl-1-adamantyl methacrylate (as shown in Resin Synthesis Example 12, column 13). A resin having such polymeric units can have improved adhesion to a substrate as well as improved resolution, pattern profiles, sensitivity and dry etching resistance (column 1, lines 60-67 and column 2, lines 2-13). Therefore, it would have been obvious to one of ordinary skill within the art to include the use of one or more lactone units and a polar -group containing polycyclic monomer as disclosed by Uetani within the polymer composition of Park to improve adhesion, resolution, sensitivity, and etching resistance.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to PONDER N. THOMPSON RUMMEL whose telephone number is (571)272-9816. The examiner can normally be reached on Monday-Friday 7:00 am - 4:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/P. N. T./
Examiner, Art Unit 1795

/Cynthia H Kelly/
Supervisory Patent Examiner, Art Unit 1795